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**Vander Kley**

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(54) **KALEIDOSCOPIC WIND MACHINE**

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(22) Filed: **Jun. 11, 2003**

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(52) **U.S. Cl.** ..... **415/4.2**; 415/4.3; 415/4.4; 415/4.5; 416/61; 416/132 A; 40/479; 446/217; 446/218
(58) **Field of Search** ..... 415/4.2, 4.3, 4.4, 415/4.5; 416/61, 132 A, 132 B; 40/479; 446/217, 218

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(57) **ABSTRACT**

A kaleidoscopic wind machine for visual entertainment and other uses. The framework of the wind machine includes a vertical mast and a horizontal axle that can swivel about the mast. One or more wheel structures are rotatably attached to the horizontal axle. Each wheel structure includes a rim, a hub, and a plurality of stays extending between and attached to the rim and hub. A plurality of jib sails are attached to each wheel framework in a manner adapted to cause the wheel to rotate about the axle when the wind blows against the sails. A positioning vane is rotatably attached to the downwind end of the axle and is adapted to point the upwind end of the axle into the wind when the wind blows.

**6 Claims, 5 Drawing Sheets**

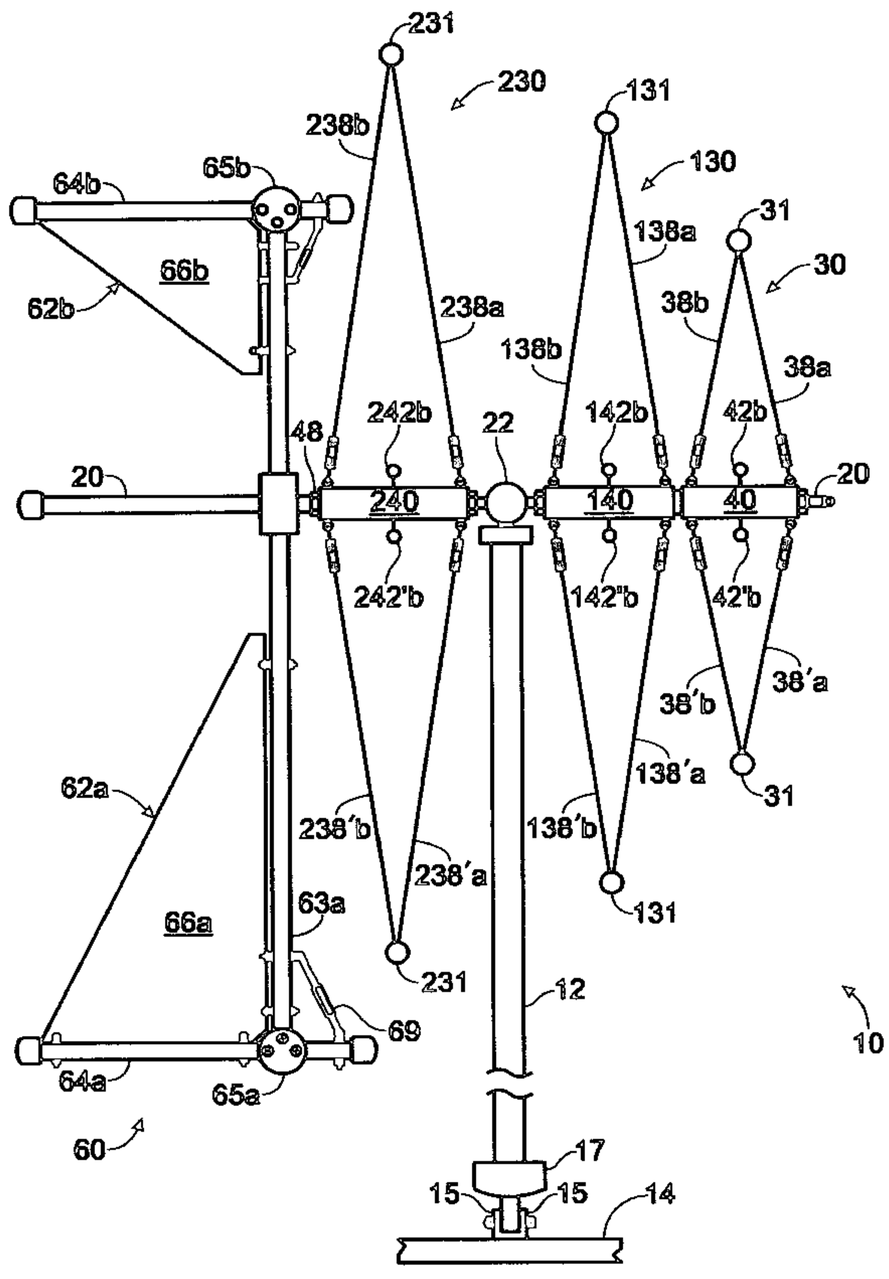
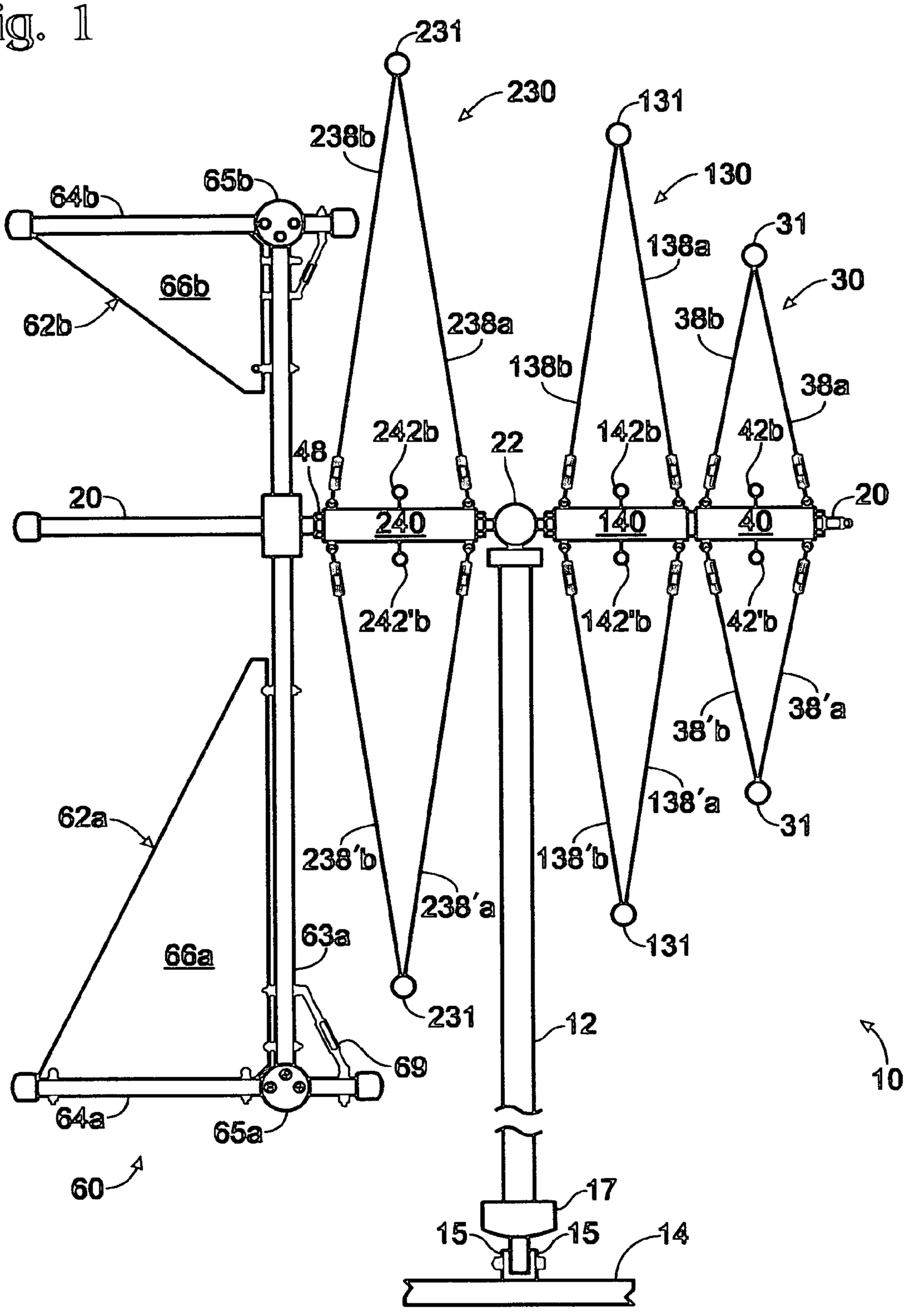


Fig. 1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48
20
240
140
40
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242'b
142'b
42'b
38'a
38'b
62a
138'a
238'b
138'b
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14

Fig. 2

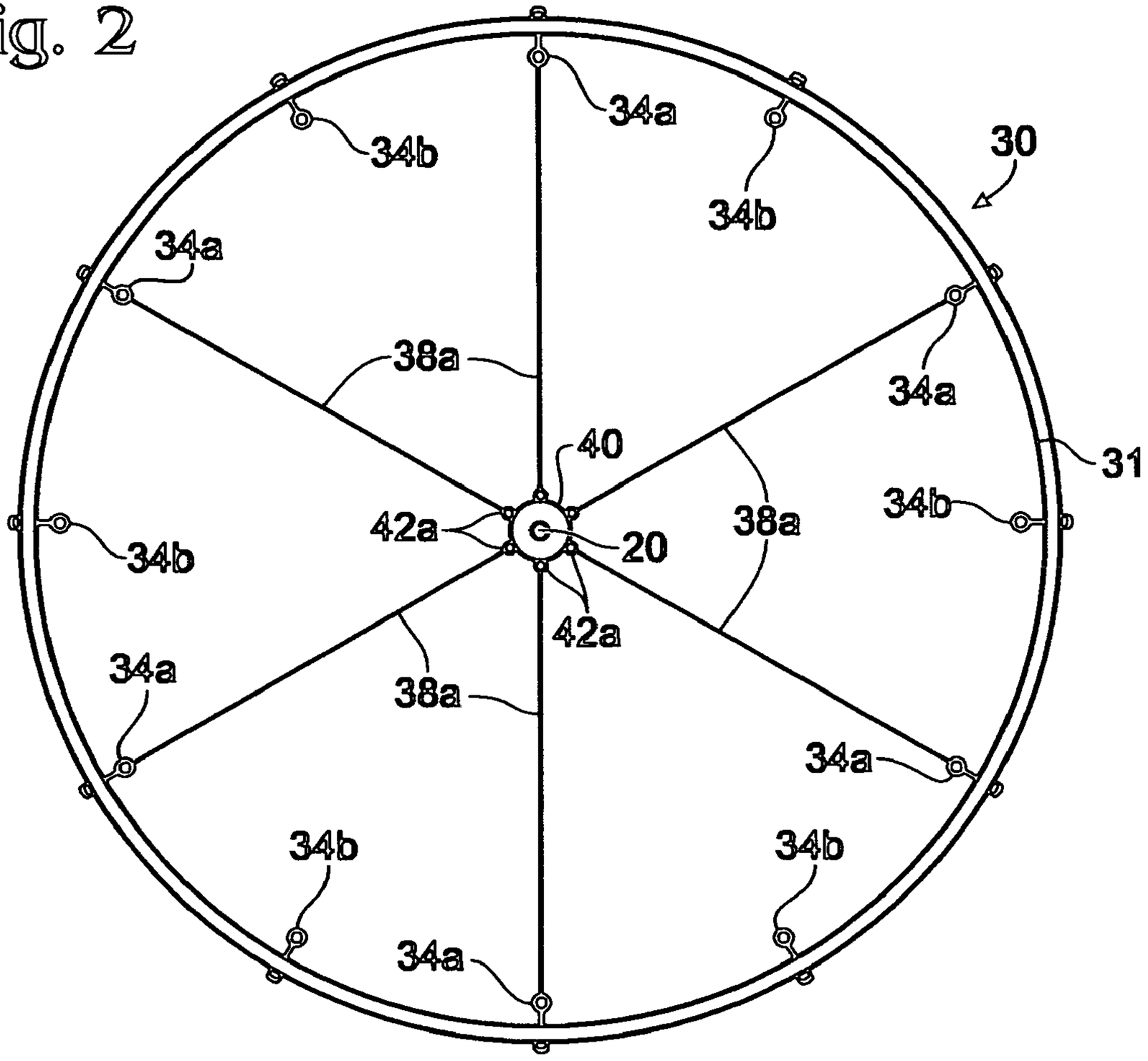
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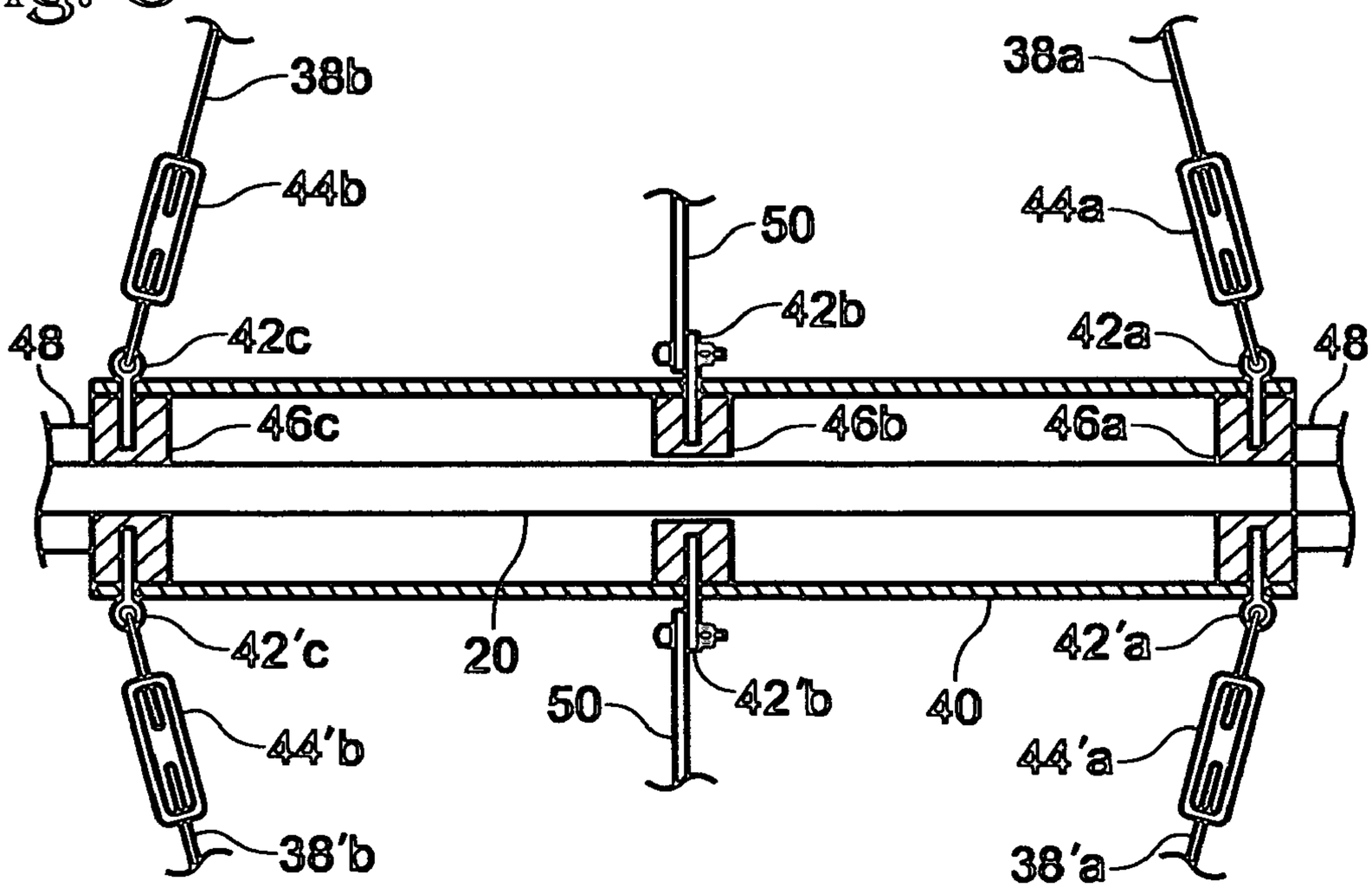
Fig. 3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44'b
44'a
38'b
38'a

Fig. 4

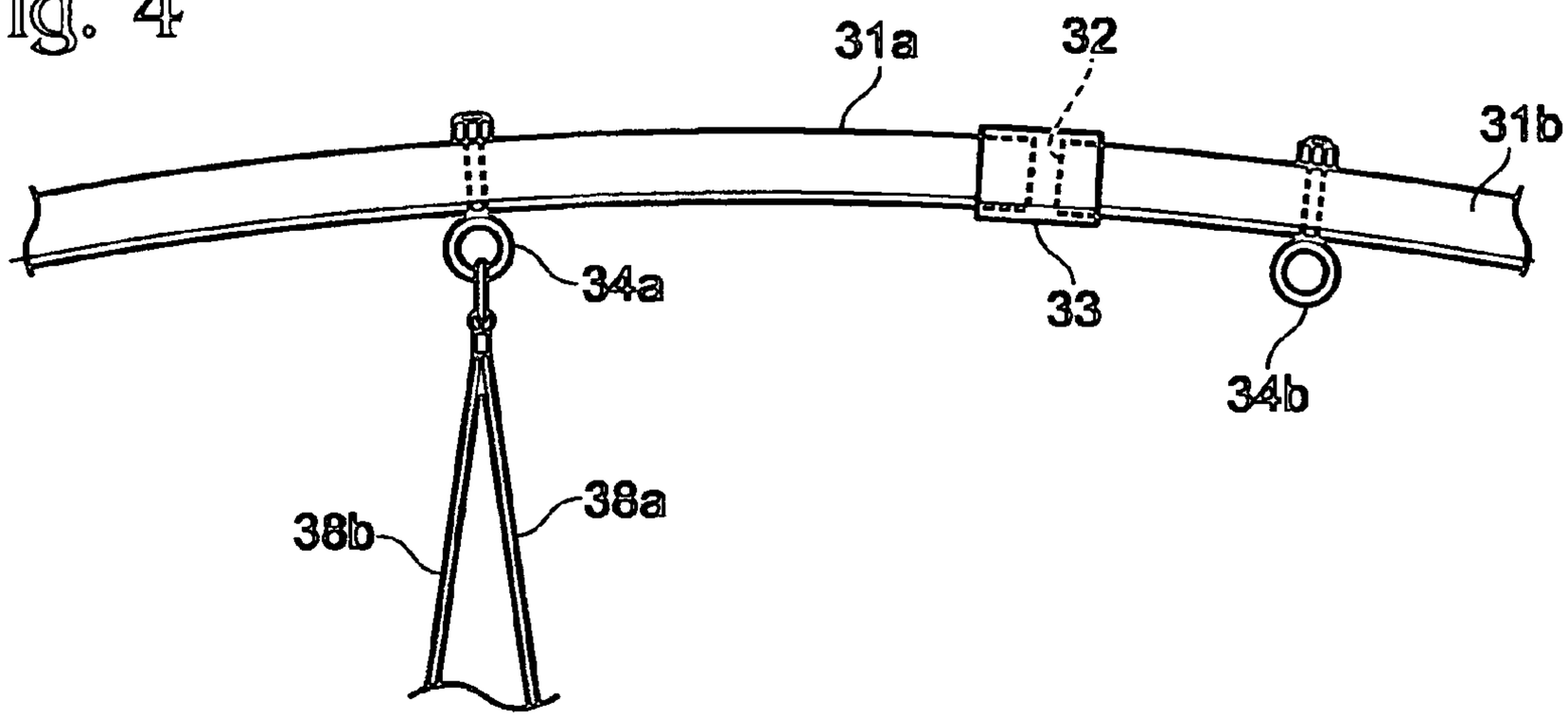
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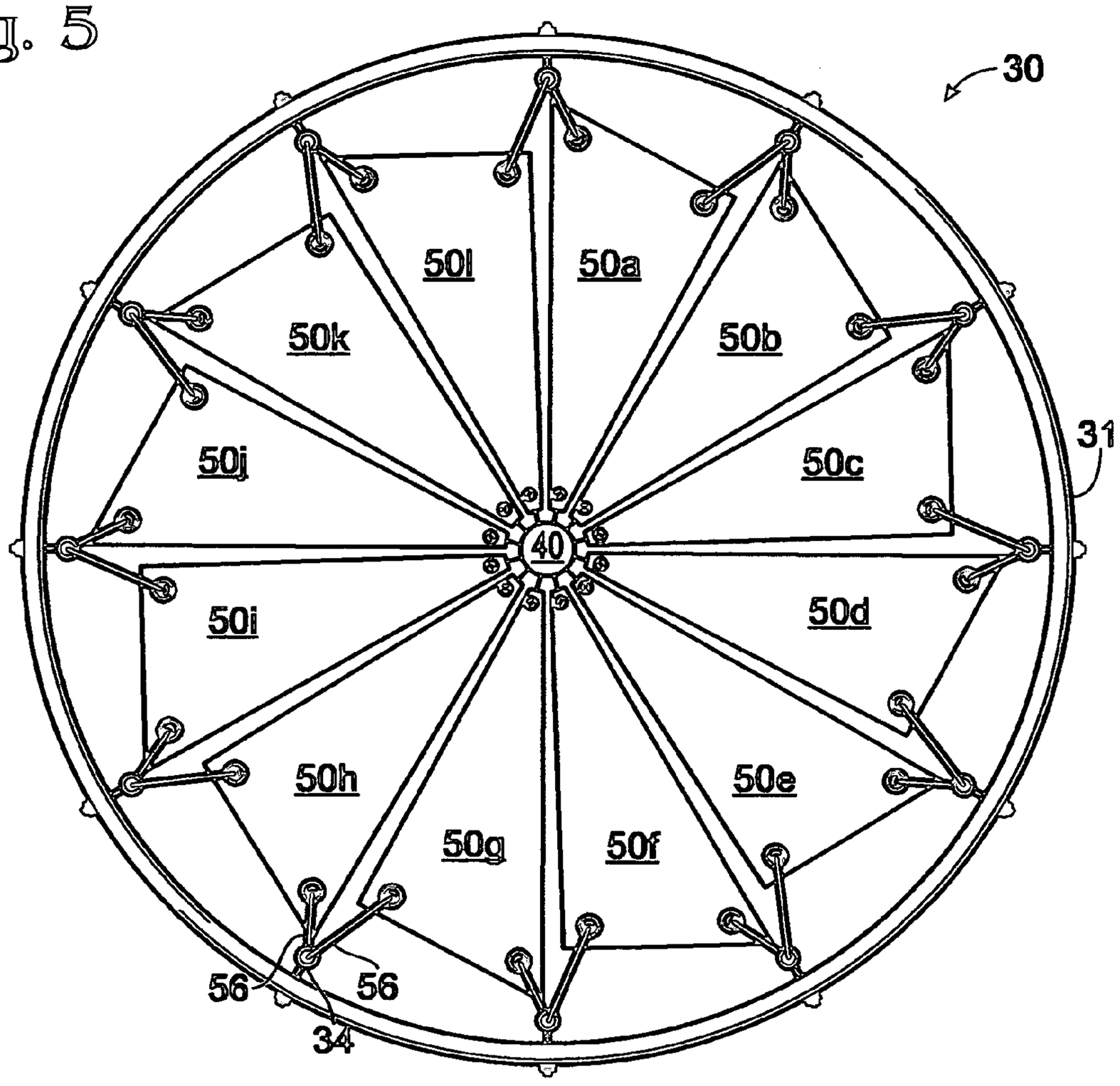
Fig. 5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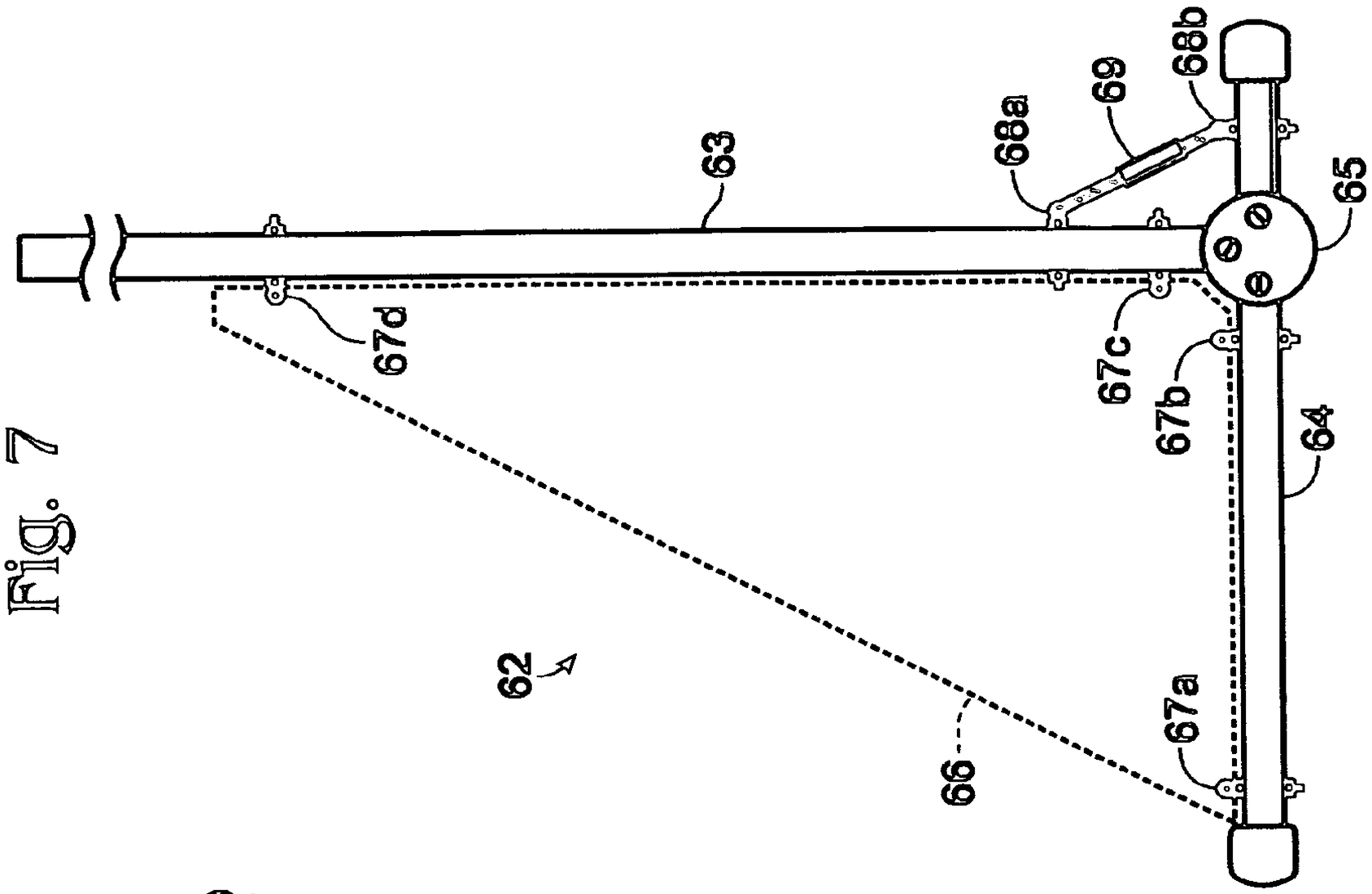



Fig. 7

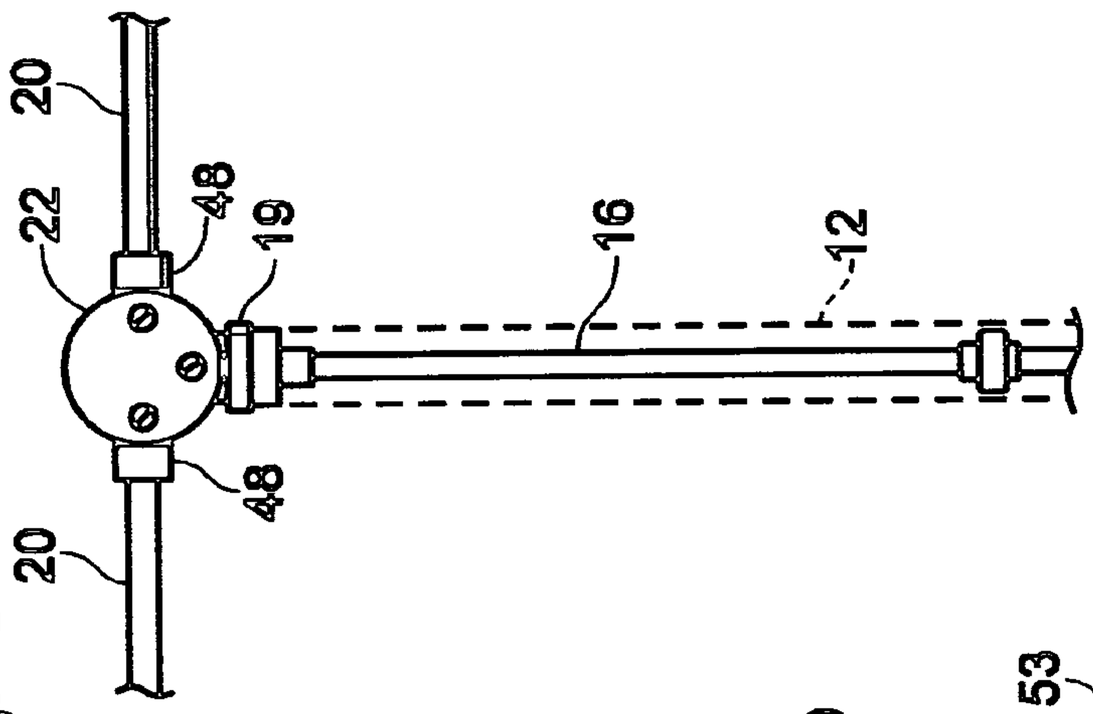



Fig. 6

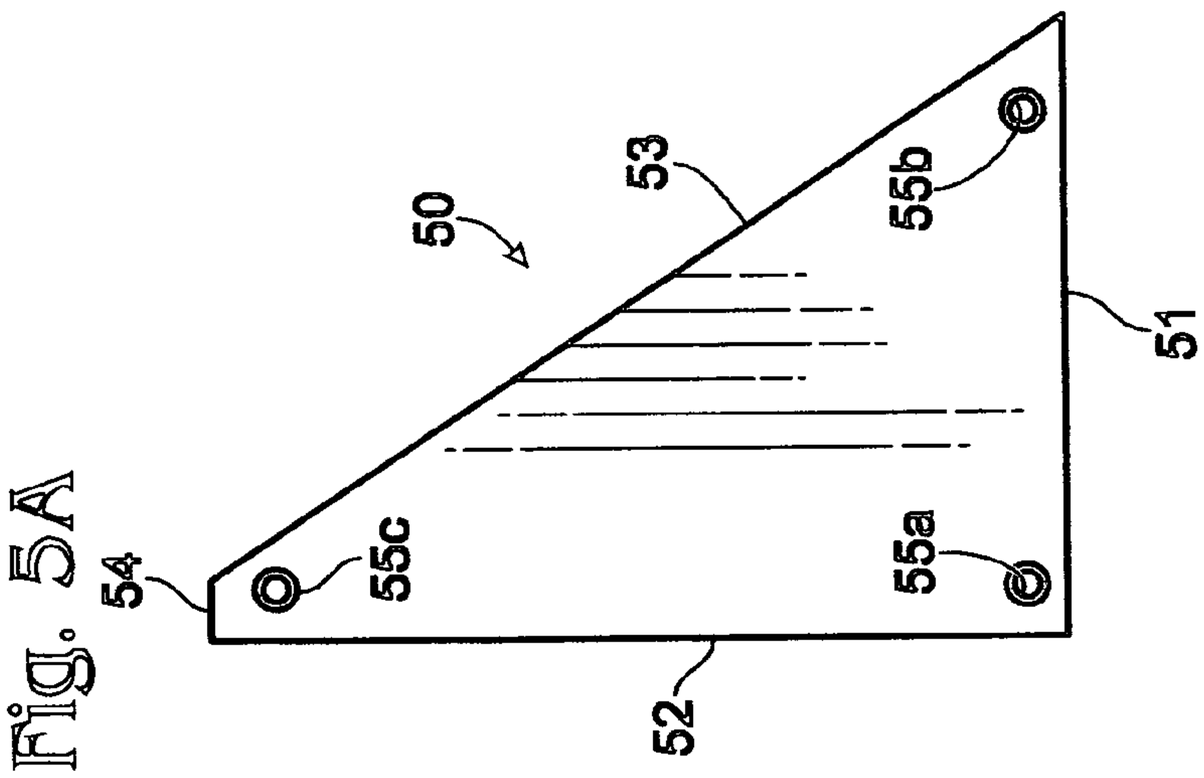
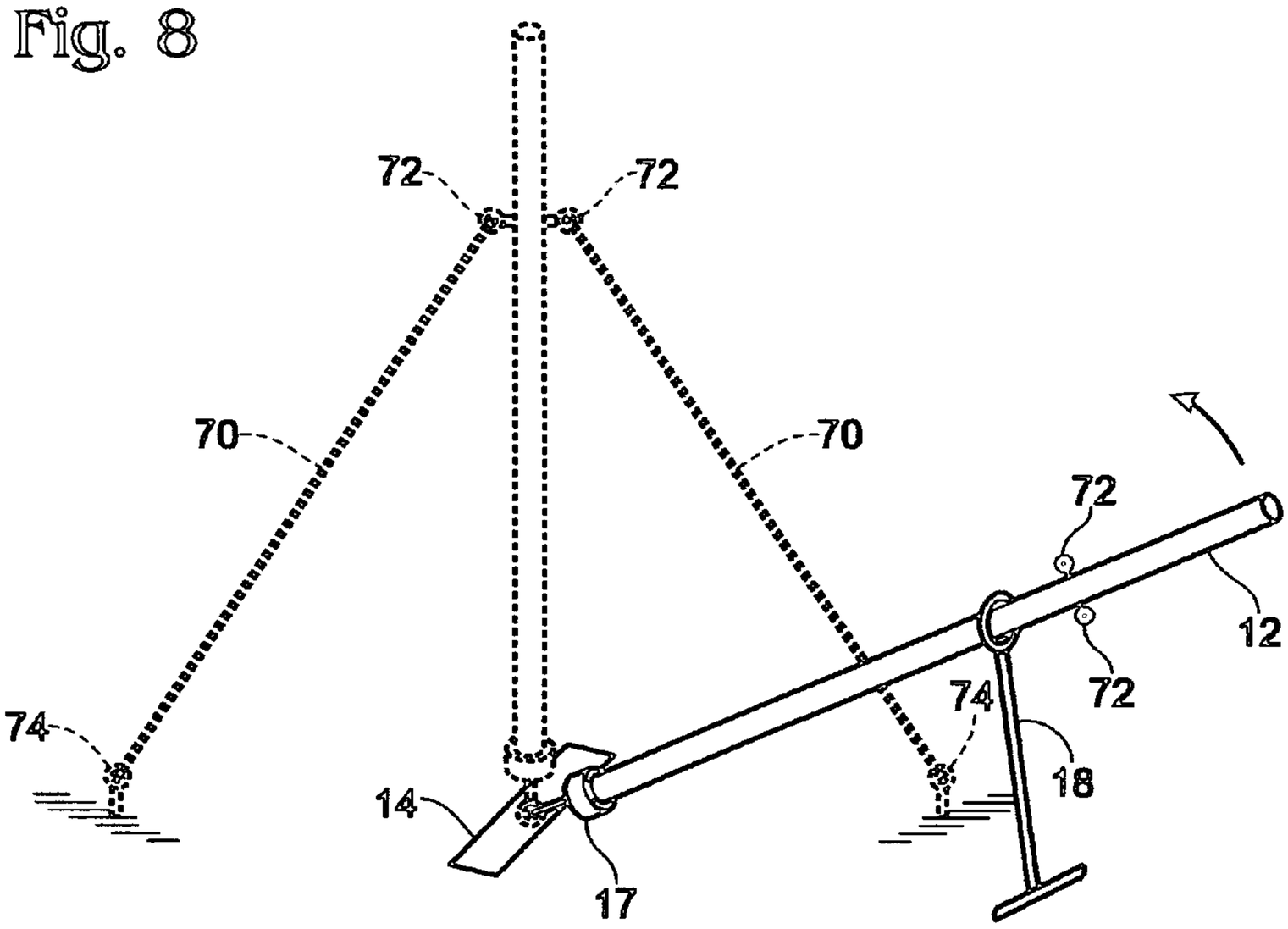



Fig. 5A

Fig. 8



# KALEIDOSCOPIC WIND MACHINE

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/388,546, filed Jun. 12, 2002.

## BACKGROUND OF THE INVENTION

This invention relates to a kaleidoscopic wind machine for providing visual entertainment and other uses.

Windmills have been around since the seventh century. Such windmills use sails to capture the force of the wind and translate that force into power used to turn a grindstone or to drive a pump.

A functionally similar device is a child's pinwheel. Such toy pinwheels are hand held, and include a wheel having colored vanes of paper or plastic that is pinned to a stick, or located on an axle extending at right angles to a stick, so as to revolve around the pin or axle when blown by the wind or moved rapidly through the air by hand motion.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a kaleidoscopic wind machine on a large scale.

The kaleidoscopic wind machine of the present invention can be used for agricultural uses, such as scarecrows for deer, birds, etc., by businesses to attract customers and to show the location of the business, by schools to display the school's colors, or used purely for visual entertainment and pleasure. The rotating hub can also be connected to an electric generator or pump by a pulley and belt arrangement.

The kaleidoscopic wind machine of the present invention has one or more wheels, each wheel having a plurality of decorative jib sails which can capture the wind and cause the wheel to rotate about an axis. The sails may have different colors or designs.

The wind machine of the present invention includes a vertical mast or stanchion having a horizontal axle rotatably attached to its upper end with one or more decorative wheels rotatably attached to the axle. Each wheel includes a circular rim and a hub rotatably attached to the axle. A plurality of stays extend between the rim and the hub. A plurality of triangular sails ("jib sails") are attached to, and extend between, the hub and rim. A positioning wind vane is attached to the downwind end of the horizontal axle to keep the upwind end of the axle pointed into the wind.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation view of the framework of the wind machine of the present invention, shown without the jib sails;

FIG. **2** is a front elevation view of the rim, stay and hub framework of a single wheel of the wind machine of the present invention;

FIG. **3** is a side view in cross-section of a hub for securing a single wheel to the horizontal axle of the wind machine of the present invention;

FIG. **4** is a partial front view in cross-section of a portion of the rim of a single wheel of the wind machine of the present invention;

FIG. **5** is a front elevation view of a single wheel showing the jib sails rigged to the wheel framework of the wind machine of the present invention;



FIG. **5A** is a front elevation view of a single sail of the wind machine of the present invention;

FIG. **6** is a front elevation view of the vertical/horizontal axle subassembly of the wind machine of the present invention;

FIG. **7** is a side elevation view of one of the rudder sails and associated framework of the wind machine of the present invention; and

FIG. **8** is a perspective view of the wind machine of the present invention during assembly and, in phantom, the wind machine in its raised position.

## DESCRIPTION OF PREFERRED EMBODIMENTS

The kaleidoscopic wind machine **10** of the present invention includes a tubular mast **12** pivotally attached to a base **14**. A tubular vertical axle **16** is positioned inside mast **12**, as best seen in FIG. **6**. The longitudinal axis of vertical axle **16** is coextensive with the longitudinal axis of tubular mast **12**, and vertical axle **16** is rotatable around the longitudinal axis of mast **12**.

A tubular horizontal axle **20** is attached perpendicularly to the outer end of vertical axle **16** by means of attachment fitting **22**. Attachment fitting **22** divides axle **20** into an upwind end and a downwind end.

Tubular vertical and horizontal axles **16** and **20** are preferably made of stainless steel. A steel reinforcing bar (not shown) may be inserted through horizontal axle **20**.

Three wheels **30**, **130**, and **230** are rotatably attached to horizontal axle **20**. Although the invention will be described relative to a preferred embodiment where wind machine **10** has three wheels **30**, **130**, and **230**, it is to be understood that this is not a limiting number.

Wheel **30** is an upwind wheel that is rotatably attached to axle **20** on its upwind end. Wheel **130** is an intermediate wheel that is rotatably attached to axle **20** on its upwind end between upwind wheel **30** and attachment fitting **22**. Wheel **230** is a downwind wheel rotatably attached to axle **20** on its downwind end.

Wheels **30**, **130**, and **230** are identical in structure, differing only in their diameters, as shown. Wheel **30** will be described in detail, it being understood that wheels **130** and **230** would have corresponding and identical structural characteristics, differing only in size. The reference numbers used to describe the various parts of wheel **30** are increased by **100** and **200** to describe the corresponding parts of wheels **130** and **230**, respectively.

Wheel **30** includes a circular rim **31** comprised of two or more tubular sections **31***a*, **31***b*, etc., joined together at joints **32** by a coupling union **33**, as best seen in FIG. **4**. Tubular sections **31** are, preferably, made of bendable polyvinyl chloride ("PVC") tubing. Tubular sections **31** are bent into a circle on a jig and the ends joined. A bendable steel reinforcing bar (not shown) may be inserted into tubular sections **31** prior to bending.

A plurality of rim eye bolts **34***a*, **34***b* are attached to rim **31**, preferably 30 degrees apart.

A plurality of fore and aft stays **38***a* and **38***b*, respectively, extend between, and are attached to, rim eye bolts **34***a* and hub eye bolts **42***a* and **42***c*, respectively. Similarly, stays **38**'*a* and **38**'*b* extend between, and are attached to rim eye bolts **34***a* and hub eye bolts **42**'*a* and **42**'*c*, respectively. Hub eye bolts **42***a*, **42**'*a*, **42***c* and **42**'*c* are positioned equidistantly around tubular hub **40**, preferably 60 degrees apart. Stays **38** are attached at their upper ends to every other rim eye bolt

(designated as **34***a* in the drawings). However, for larger wheels, stays **38** may be attached to every rim eye bolt **34***a* and **34***b*.

As best seen in FIG. **3**, the lower ends of each of the fore stay portions **38***a* and **38**'*a* are attached to the forward hub eyebolts **42***a* and **42**'*a* by means of turnbuckles **44***a* and **44**'*a*, respectively, and the lower ends of each of the aft stay portions **38***b* and **38**'*b* are attached to the rear hub eyebolts **42***c* and **42**'*c* by means of turnbuckles **44***b* and **44**'*b*, respectively. Turnbuckles **44** are used to tighten stays **38**.

As seen in FIG. **3**, tubular hub **40** is rotatably attached to axle **20** by means of bearing bushings **46***a*, **46***b* and **46***c*. Eyebolts **42** are positioned into bearing bushings **46** so that there is no slippage between the outer surface of the bushings **46** and the inner surface of hub **40**.

Spacing bushings **48** keep the hubs of the wheels **30**, **130**, and **230** properly positioned on axle **20**.

The rigging of jib sails **50** onto wheel **30** and hub **40** is shown in FIG. **5**, it being understood that the rigging of jib sails onto wheels **130** and **230** is accomplished in a similar manner.

As best seen in FIG. **5**A, each jib sail **50** is a generally triangular piece of sailcloth, such as Dacron. Each jib sail **50** has a short base **51** (the "foot") and two longer sides **52** and **53** that come closely together at truncated apex **54** (the "head"). As seen in FIG. **5**, the foot **51** of each sail **50** is positioned adjacent rim **31** with the head **54** of each sail **50** being located adjacent hub **40**.

Grommets **55***a* and **55***b* are located at each end of foot **51**. A cord or cords **56** passing through grommets **55***a* and **55***b* of adjacent jib sails **50** is used to tie those corners of the adjacent sails to the adjacent eye bolt **34**. Alternatively, nuts and bolts may be used in place of cords **56** to attach the feet **51** of jib sails **50** to adjacent eyebolts **34**.

Grommets **55***c* located at the head **54** of jib sails **50** are attached to eyebolts **42***b* and **42**'*b* by nuts and bolts, as best seen in FIG. **3**.

The jib sails **50** are decorated to provide a pleasing visual image when the wheels are rotating. Many combinations of colors and/or designs may be used. For example, a patriotic theme would have alternating red, white and blue colored jib sails. The colors could be selected to represent school or corporate colors. One particularly visually effective combination is to use the colors of the spectrum arranged in order of wavelength.

As seen in FIG. **1**, a positioning vane **60** is rotatably attached to the rear (trailing) end of horizontal axle **20**. Positioning vane **60** has three identically constructed tail sections **62**, only two of which (**62***a* and **62***b*)) are shown in FIG. **1**. The major planes of tail sections **62** all pass through the longitudinal axis of horizontal axle **20**, and are spaced 120 degrees apart. Therefore, the upper tail section **62***b* is shown foreshortened in FIG. **1** since it extends out of the plane of drawing.

As best seen in FIGS. **1** and **7**, each tail section **62** includes a tubular vertical frame member **63** and a tubular horizontal frame member **64**. Tubular frame members **63** and **64** are preferably made of stainless steel. Horizontal frame member **64** passes through an opening in union member **65** and is attached thereto by threaded fastening members. Vertical frame member **63** is inserted into an opening in union member **65** and attached thereto by a threaded fastening member. A tail section jib sail **66** is attached to vertical and horizontal frame members **63** and **64** by nuts and bolts passing through grommets located adjacent the corners of the sail, as shown, and eyebolts **67***a–d* attached to vertical and horizontal frame members **63** and **64**.

Eyebolts **68***a, b* extend from vertical and horizontal frame members **63** and **64**, respectively, and are attached to a turnbuckle **69** to provide bracing for the tail section frame.

A wire or wires may be passed through the outer eye bolts and/or bodies of turnbuckles **44** to prevent their rotating and becoming unfastened during use of the device.

In operation, base **14**, which can be a metal plate with pivot ears **15** extending therefrom (FIG. **8**), is affixed to the ground, such as by bolting to a poured-in-place concrete pad (not shown). Pivot head **17**, threadably attached to the base of mast **12**, is pivotally attached to pivot ears **15** by means of a threaded fastener and associated washers. A removable jack member **18** is pivotally attached to mid-portion of mast **12**, and allows mast **12** to be rested at the approximate angle shown in FIG. **8**. Vertical axle **16** of the vertical/horizontal axle subassembly is then inserted into tubular mast **12** until the top of mast **12** abuts against the bottom of stop member **19**. Wheels **30**, **130** and **230**, and positioning vane **60**, are placed onto horizontal axle **20**, being spaced apart by spacer members such as spacer members **48**. Wheels **30**, **130** and **230** are free to rotate about horizontal axle **20**.

Mast **12** is then raised into a vertical position (in the direction of the arrow in FIG. **8**) and four mainstays **70** (only two of which are shown and which have previously been attached at one end to one of four mainstay eyebolts **72**) attached to suitable staking members **74** which have been driven into the ground.

As the wind blows against the jib sails of wheels **30**, **130**, and **230**, the wheels rotate about axle **20**. As mentioned above, it is preferable to rig the angle of the sails so that wheels **30** and **230** rotate clockwise and wheel **130** rotates counterclockwise. Positioning vane **60** keeps the upwind end of axle **20** pointed into the wind so that the planes of wheels **30**, **130**, and **230** remain substantially perpendicular to the direction of the wind at all times.

Although the kaleidoscopic wind machine **10** of the present invention can be made of many different sizes, it is desirable that it be large enough to be seen from some distance, yet not so large as to cause structural problems in construction or operation.

It will be obvious to those having skill in the art that many changes may be made to the details of the above-described embodiments of this invention without departing from the underlying principles thereof. The scope of the present invention should, therefore, be determined only by the following claims.

What is claimed is:

**1**. A kaleidoscopic wind machine comprising:

a vertically disposed mast;

a horizontally disposed axle attached to said mast by an attachment fitting in a manner adapted to allow said axle to swivel around said mast, said attachment fitting dividing said axle into an upwind end and a downwind end;

at least one upwind wheel rotatably attached to said axle on said upwind end, at least one downwind wheel rotatably attached to said axle on said downwind end, each of said wheels including a rim, a hub, a plurality of stays extending between said rim and said hub, and a plurality of decorative sails extending between said rim and said hub; and

a positioning vane attached to said axle downwind of said downwind wheel and adapted to cause the upwind end of said axle to point into the wind.

**2**. The wind machine of claim **1** wherein said plurality of sails of said upwind and downwind wheels are rigged at an angle adapted to cause said upwind and downwind wheels to rotate in opposite directions.

**3**. The wind machine of claim **1** including an intermediate wheel rotatably attached to said axle on said upwind end and between said upwind wheel and said attachment fitting.

**4**. The wind machine of claim **3** wherein said upwind wheel has a smaller diameter than said intermediate wheel, and said intermediate wheel has a smaller diameter than said downwind wheel.

**5**. The wind machine of claim **3** wherein said plurality of sails of said upwind, intermediate and downwind wheels are rigged at an angle adapted to cause said upwind and intermediate wheels to rotate in opposite directions, and to cause said intermediate and downwind wheels to rotate in opposite directions.



**6**. The wind machine of claim **1** wherein said mast is tubular and has an upper and lower end, said mast including a vertical axle having an upper and lower end positioned inside said mast and adapted to rotate within said mast, the upper end of said vertical axle being attached to said horizontally disposed axle by said attachment fitting.

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